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Environmental Landscaping

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Introduction
Energy Conservation
Water Conservation
Natural Lawn Care
Other Landscaping
Climate Specific Strategies
Federal Initiatives
Cool Communities
For More Information
Bibliography

Introduction

Environmental landscaping can be the best long-term investment made to your installation or home. It conserves energy, saves water, reduces pollution, and saves money. Planting trees, shrubs, vines, bushes, and grasses can reduce heating and cooling costs, while improving the appearance of your community. A well designed landscape will:

- cut your summer and winter heating and cooling costs dramatically;
- protect your home from winter wind and summer sun; and
- reduce consumption of water, pesticides, and fuel.

Energy Conservation

When using landscaping to conserve energy, you basically control summer heat, and conserve winter heat.

Controlling Summer Heat

Trees, shrubs, and grasses can control summer heat by blocking the sun to create shade and by absorbing heat. This, in turn, can reduce the air temperature surrounding your home by allowing plants to evaporate their stored water and by reducing the sun's radiant heat loads. Landscaping to control heat is therefore economical. For example, tests performed on a variety of homes in Florida showed a 50 percent reduction in air conditioning costs after appropriate landscaping.

Conserving Winter Heat

According to the U.S. Department of Energy, landscaping can save up to 30 percent on heating bills. Studies indicate using trees as windbreaks around poorly insulated homes, have significantly reduced heating costs.

Pollution Prevention

By controlling the temperature with plants, you can reduce the use of air conditioners and furnaces, thereby, reducing energy consumption. This, in turn, reduces the production of pollutants at central power facilities that cause numerous problems including global warming, acid rain, and smog. Plants also absorb carbon dioxide, the largest contributor to global warming.

Water Conservation

Landscaping also has a great effect on water consumption. In many areas of the country, lawns are responsible for 50 percent of household water consumption. By using plants that fit the region and location, you can lower your outdoor water needs by 80 percent and reduce yard maintenance.

Watering Practices

How you water your grass and plants can affect the amount of water used. Avoid overhead sprinklers that shoot water straight into the air. Instead use a low-pressure sprinkler that has a circular pattern or a ground soaker. To avoid water waste through evaporation and the creation of disease problems, water your grass in the early morning hours. Avoid over-watering!

Xeriscaping

Xeriscaping is the conservation of water through creative landscaping. This can usually be achieved by choosing plants that are drought resistant and often native to the area. Once established, these plants are able to survive on rainfall and groundwater. There are **seven** principles to a Xeriscape landscape:

1. *Planning and Design* - A well planned landscape design will be more water efficient than the traditional lawn. Landscape architects can help you design your lawn and choose appropriate plants.
2. *Soil Analysis and Improvement* - Soil analysis will determine if improvement is needed for better absorption of water. Many soils require modification of the pH, or the acidity or alkalinity, to improve their ability to support plant life. Many Air Force bases now produce compost that can be used for soil improvement purposes.
3. *Appropriate Plant Selection* - Select trees, shrubs, and groundcovers indigenous to your region's soil and climate. These plants have lower water demand, fewer pest problems, and fewer fertilization needs.
4. *Practical Turf Areas* - Turfgrasses require more frequent watering and maintenance than most other landscape plants. Plant grass only where it will provide functional benefits. Often, grass can be replaced with less water demanding materials, or with decks and patios.
5. *Efficient Irrigation* - In addition to wasting water, excess irrigation can leach nutrients away from plant roots and increase the chances of polluting groundwater. Water the grass only when necessary or when wilting and discoloration are observed. Effective irrigation involves watering plants deeply, infrequently and slowly. This ensures root zones are thoroughly moistened, doesn't over-water the plants, and eliminates run-off.
6. *Use Mulches* - Use mulch whenever possible. Mulching is the placement of organic matter over the root zone. It conserves water by reducing moisture evaporation from the soil reducing weed populations.
7. *Appropriate Maintenance*- Xeriscape landscapes require less maintenance. A well designed landscape reduces mowing, requires less fertilization, eliminates weak unadapted plants, and uses more efficient watering techniques.

Natural Lawn Care

Fertilization

The United States has 40 million acres of yards which utilized over 200 million pounds of lawn chemicals in 1993. Current lawn care practices involve encouraging a lush green lawn through chemical fertilizers.

A naturally beautiful lawn can be achieved by avoiding excess fertilization, which disrupts the natural biological growth process of the grass. If fertilization is necessary, natural fertilizers are the best option. These include dehydrated cow manure or dried poultry manure. Dried poultry manure is more beneficial due to its high nitrogen content. For the northern lawn, fertilize once in the fall. The cool temperature slows top growth, but root growth still remains high. By spring, the increased root growth allows the grass to get off to a good start. In the south, lawns respond best to two or three light fertilizations from late spring to early fall. Another easy way to fertilize your grass is to leave the grass clippings on the lawn after mowing (mulching). Once the clippings start to decompose, they return significant nutrients to the soil.

Mowing Frequency

When and how often you mow your grass can also effect its health and durability. The key is to mow high and often, varying the frequency and blade height according to season. It is best to cut grass to around 3 inches in the summer and 2 1/2 inches in the fall and spring. During drought and heat, it is better to have longer top growth. The longer

the top growth, the deeper the root growth. Plants with deep roots will be better able to withstand drought and fight off diseases.

Integrated Pest Management

With most overprocessed lawns, pest management can be a problem. But when raising a natural lawn, there are fewer pest problems. A natural lawn has built up natural predators to battle pests. It's important to become familiar with pests and not over-react unless they're actually doing damage to your lawn.

The best method to control pests is to use natural controls, either biological or physical. This involves introducing other insects which are beneficial to your lawn, yet are predators to the pests. An example is to introduce certain insects such as praying mantises or ladybugs to feed on - and limit populations of - landscape pests.

Consult with the Installation Pest Management Coordinator prior to using self-help pesticides, submitting service order requests for pest control, or contracting for pest control services. Additional information on integrated pest management is available from the Air Force Pest Management program manager, Mr. Wayne Fordham, DSN 523-6465.

Other Landscaping

Yards are not the only place where landscaping can be beneficial. Construction projects integrate landscape design into the development of parking lots, buildings, parks, golf courses, and streetscape.

Climate Specific Strategies

The climate in the U.S. can be divided into 4 sections: hot and arid, hot and humid, temperate, and cool. Each of these areas requires different landscaping strategies:

Hot and Arid. Install plants that:

- provide shade to cool roofs, walls, and windows
- cool the air around the home by evaporating water (evapotranspiration)
- allow summer winds to access naturally cooled homes
- block or deflect winds away from air conditioned homes with windbreaks

Hot and Humid. Install plants that:

- channel summer breezes toward the home through strategic placement of trees
- maximize summer shade with trees that will allow penetration of low angle winter sun
- avoid locating planting beds close to the home if they require frequent watering

Temperate. Install plants that:

- maximize warming effects of the sun in the winter
- deflect winter winds away from buildings
- funnel summer breezes toward the home

Cool. Install plants that:

- use dense windbreaks to protect the home from cold winter winds
- allow winter sun to reach south facing windows
- if summer overheating is a problem, shade south and west windows and walls

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Federal Initiatives

President Clinton issued a memorandum "Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds," 1994, directing Federal agencies to use landscaping techniques that "complement and enhance the local environment and seek to minimize the adverse effects landscaping will have on it." The

memorandum states Federal grounds and projects should:

- use native plants for landscaping;
- use design or construction practices that minimize adverse effects on the natural habitat;
- seek to prevent pollution by reducing fertilizer and pesticide use; and
- implement water efficient practices.

In response to this memorandum, the Headquarters, Air Force Center for Environmental Excellence (HQ AFCEE) Design Group is compiling the United States Air Force Landscape Design Guide, which details the planning process, landscape design, and implementation of landscape design on Air Force installations. At present, there is no estimated completion date for this guide. As sections are completed, they will be mailed to the field.

Cool Communities

On the average, urban areas are 5 to 9 degrees warmer than the rural areas surrounding them, a phenomenon known as "urban heat island." In the summer this amounts to $1 million per hour in additional cooling costs, and releases millions of tons of carbon dioxide to the atmosphere. Three to eight percent of current electricity demand is used to compensate for the urban heat island effect.

To reduce the effects of the urban heat island, American Forests/Global Releaf, the U.S. Environmental Protection Agency, Department of Energy, Department of Defense, United States Department of Agriculture (USDA) Forest Service, and other organizations are participating in a program called Cool Communities. The program challenges citizens, government agencies, and businesses to create positive, measurable change in urban environmental conditions and energy consumption, as well as increase public awareness.

An example of a Cool Community initiative is the use of trees to shade homes and of light colors on parking lots, buildings, and roofs to reflect heat radiation. These alone can potentially reduce energy bills by $100-$200 per home per year.

Davis-Monthan AFB: A Cool Community Site

The housing area at Davis-Monthan AFB in Tucson, Arizona was one of the sites chosen to initiate the Cool Communities program. It was chosen to measure these effects because it is a real community where kids leave the door open and dogs run in and out of the house.

During November and December of 1993, based on the advice of landscape architects who chose the plant species and the locations, 275 large trees (6-10 feet tall) were planted to shade and cool 104 residences. Baseline data on local climate and energy use was compiled using an eight-page questionnaire, produced by an advisory group. The same questionnaire will be used five years after inception of the program to track changes.

Energy monitoring devices and weather stations were installed in the housing area to record direct and indirect environmental improvements from the project. Tucson Electric agreed to monitor energy in the homes and the University of Arizona installed equipment to measure temperature, humidity, and windspeed outside the homes.

This project at Davis-Monthan AFB is unique in that it not only examines how trees cool a residence it shades, but also what impacts the tree's powers of shading and evapotranspiration have on the house next door and those beyond. It will take several years to complete the study because of the time required for the trees to mature.

For More Information

Contact PRO-ACT at DSN 240-4214 or (800) 233-4356 or Mr. William Bushman, HQ AFCEE/DGA, DSN 240-4239, for more information on environmental landscaping.

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